RELATION OF BORON AND ZINC APPLICATION AND OF LEAF COMPOSITION TO YIELD OF SWEET CORN

1967 - 1968

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Table 1

Total Boron in Leaves of Sweet Corn in Highest and Lowest Yielding Plots

Marietta Vegetable Crops Branch

Parts per million - Dry weight basis

Leaves Sampled:
June 30
July 15
July 29, 1955

Plot No.	Average Yield per plot Lbs.	Total Boron June 30	July 15	July 29
	Highest Yielding			
25	13216	30.5	18.7	35.0
23	12876	27.0	54.0	42.2
5	12740	22.3	53.4	28.0
24	12364	33.0	50.7	51.8
36	12200	43.0	37.0	53.0
29	12052	31.0	59.0	36.9
26	11980	39.0	53.4	43.5
4	11544	21.7	57.5	45.5
27	11464	32.0	49.2	38.5
28	11300	23.0	43.1	52.3
Average	12174	30.3	47.6	42.7
	Lowest Yielding			
31	10144	38.5	48.8	38.0
6	9840	19.5	60.2	45.0
12	9652	39.2	35.5	38.5
10	9644	26.0	32.5	29.0
32	9528	41.5	41.7	31.9
14	9140	24.9	39.5	40.0
7	8944	18.6	45.0	33.5
13	8832	23.0	39.5	49.7
9	8936	34.0	54.9	44.8
11	8180	24.7	51.3	46.5
Average	9244	29.0	45.0	40.0

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Table 2

Effect of Phosphorous, Boron and Zinc Applications on Yield of Sweet Corn 1967

Muck Crops Research Branch — Cultivar: Gold Cup

Amounts applied per acre (pounds)

Phosphorous as Superphosphate (20%)	Borax (45%)	Zinc Sulfate
0	0	0
1000	2	30
	4	
	8	
	16	

Results of Treatments.

1. These treatments resulted in no statistically significant increase in number of ears and weight of ears per plot.

2. Both phosphorous and boron together at the highest boron level increased number of kernels per row and total number of kernels per ear.

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Table 3

Total Nitrogen, Phosphorous, Boron and Zinc in Leaves of Sweet Corn 1967

Muck Crops Research Branch, Celeryville 6 Sampling Dates

Nitrogen and Phosphorous - percentage on dry weight basis

Boron and Zinc - Parts per million dry weight basis

Date	Superphosphate (lbs per acre)	Leaf N	Leaf P	Borax (lbs per acre)	Leaf N	Leaf B	Zinc sulfate (lbs per acre)	Leaf N	Leaf Zn
June 21	0	4.14	.87	0	4.06	6	0	4.16	49
	1000	4.14	.89	2	4.17	5	30	4.12	49
				4	4.48	7			
				8	4.18	7			
				16	4.15	10			
				Top Leaves					
July 5	0	3.19	.58	0	3.25	4	0	3.24	17
	1000	3.27	.65	2	3.18	4	30	3.23	19
				4	3.19	4			
				8	3.31	5			
				16	3.25	6			
				Middle Leaves					
July 12	0	3.05	.55	0	3.07	4	0	3.07	23
	1000	3.05	.57	2	3.01	4	30	3.04	24
				4	3.02	5			
				8	3.06	6			
				16	3.10	7			
				Leaf Just Below Ear					

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Table 3 Cont'd

Date	Superphosphate (lbs per acre)	Leaf N	Leaf P	Borax (lbs per acre)	Leaf N	Leaf B	Zinc Sulfate (lbs per acre)	Leaf N	Leaf Zn
July 12	0	3.07	.50	0	3.04	6	0	3.07	32
	1000	3.11	.54	2	3.10	6	30	3.10	34
				4	3.11	8			
				8	3.13	7			
				16	3.10	8			
				Leaves at Top of Plant					
July 19	0	3.21	.56	0	3.26	4	0	3.18	27
	1000	3.11	.58	2	3.16	4	30	3.17	29
				4	3.13	4			
				8	3.16	5			
				16	3.16	6			
				Leaf at Base of Ear - Main Stalk					
July 26	0	2.77	.66	0	2.72	7	0	2.76	31
	1000	2.73	.71	2	2.82	7	30	2.74	33
				4	2.75	8			
				8	2.78	8			
				16	2.70	9			
				Leaf at Base of Ear - Main Stalk					
August 2	0	2.71	.77	0	2.64	7	0	2.73	33
	1000	2.70	.82	2	2.70	8	30	2.69	38
				4	2.81	8			
				8	2.82	8			
				16	2.65	10			
				Leaf at Base of Ear - Main Stalk					

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Table 4

Effect of Boron and Zinc applications on Yield of Sweet Corn 1967

Marietta Vegetable Crops Branch

1. Yield

Applied boron and zinc had no statistically significant effect upon:

1. Number of ears
2. Weight of ears
3. Number of kernels

2. Important correlations between leaf nutrients and yield

1. On June 22, July 6 and July 10 the higher the leaf nitrogen the greater the weight of ears per plot.
2. No statistically significant correlations between leaf boron and zinc on yield were obtained at any sampling date.

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Table 5

Total Nitrogen and Boron in Leaves of Sweet Corn 1967

Marietta Vegetable Crops Branch — 5 Sampling Dates

Nitrogen - Percentage on Dry Weight Basis

Boron - Parts per million on Dry Weight Basis

Date	Borax (lbs per acre)	Leaf N	Leaf B
June 22	0	3.89	10
	2.6	3.89	12
	5.1	3.85	15
	10.0	3.90	27
	20.1	3.83	54
Leaf just below Top Curled Leaf			
July 6	0	3.67	8
	2.6	3.67	8
	5.1	3.57	10
	10.0	3.56	12
	20.1	3.61	19
Leaf below Ear - Main Stalk			
July 6	0	3.37	10
	2.6	3.43	11
	5.1	3.36	12
	10.0	3.40	15
	20.1	3.37	26
Leaf just below Tassel			

Date	Borax (lbs per acre)	Leaf N	Leaf B
July 10	0	3.65	12
	2.6	3.69	7
	5.1	3.66	7
	10.0	3.64	10
	20.1	3.62	12
Leaf below Ear - Main Stalk			
July 10	0	3.66	7
	2.6	3.64	7
	5.1	3.77	8
	10.0	3.65	9
	20.1	3.63	16
Top Leaf just below Tassel			
July 19	0	3.32	8
	2.6	3.48	8
	5.1	3.29	7
	10.0	3.37	12
	20.1	3.31	19
Leaf below Ear - Main Stalk			

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Table 5 Cont'd

Date	Borax (lbs per acre)	Leaf N	Leaf B
July 24	0	3.20	6
	2.6	3.14	7
	5.1	3.19	7
	10.0	3.30	10
	20.1	3.19	12

Leaf below Ear - Main Stalk

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Table 6

Total Nitrogen and Zinc in Leaves of Sweet Corn 1967

Marietta Vegetable Crops Branch

Nitrogen - Percentage on dry weight basis

Zinc - Parts per million dry weight basis

Date	Zinc Sulfate (lbs per acre)	Leaf N	Leaf Zn
June 22	0	3.86	56
	15.1	3.87	84
	30.1	3.88	97
Leaf just Below Top Curled Leaf			
July 6	0	3.61	58
	15.1	3.64	81
	30.1	3.61	98
Leaf Below Ear - Main Stalk			
July 6	0	3.37	87
	15.1	3.38	113
	30.1	3.41	128
Leaf just Below Tassel			
July 10	0	3.67	41
	15.1	3.65	51
	30.1	3.64	60
Leaf Below Ear - Main Stalk			

Date	Zinc Sulfate (lbs per acre)	Leaf N	Leaf Zn
July 10	0	3.67	58
	15.1	3.67	69
	30.1	3.66	82
Leaf Just Below Tassel			
July 19	0	3.41	49
	15.1	3.40	63
	30.1	3.27	75
Leaf Below Ear - Main Stalk			
July 24	0	3.22	42
	15.1	3.19	56
	30.1	3.20	60
Leaf Below Ear - Main Stalk			

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Table 7

Effect of Boron, Zinc and Phosphorous Applications upon Yield of Sweet Corn 1968

Marietta Vegetable Crops Branch

1. Stand

   Boron at the two highest levels and particularly the largest (40 lbs per acre of borax) resulted in a reduced stand.

2. Number Marketable Ears

   The highest application of borax resulted in a reduced number of marketable ears.

3. Weight of Marketable Ears

   The highest application of borax resulted in a reduced weight of marketable ears.

   The larger phosphorous application resulted in an increased weight of marketable ears.

4. Number of Culls

   At the highest level of phosphorous and zinc the number of culls increased significantly.

5. Weight of Culls

   At the highest level of phosphorous and zinc the weight of culls increased significantly.

6. The Number of Rows Per Ear, Kernels Per Row and Total Number of Kernels were not affected by applications of boron, zinc and phosphorous.

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Table 8

Total Nitrogen, Phosphorous and Boron in Leaves of Sweet Corn 1968

Marietta Vegetable Crops Branch 3 Sampling Dates

Nitrogen and Phosphorous - Percentage on Dry Weight Basis

Boron and Zinc - Parts per million on Dry Weight Basis

Date	Borax (lbs per acre)	Leaf N	Leaf B	Superphosphate (lbs per acre)	Leaf N	Leaf P	Zinc Sulfate (lbs per acre)	Leaf N	Leaf Zn
June 28	0	4.15	9	0	4.08	.44	0	4.04	34
	5.2	3.98	12	1260	4.11	.49	30.2	4.09	48
	10.2	4.14	15				60.2	4.16	57
	20.0	4.06	29						
	40.2	4.14	64						
				2nd Leaf Below Top of Plant					
July 9	0	3.76	13	0	3.80	.42	0	3.72	40
	5.2	3.78	14	1260	3.70	.46	30.2	3.70	48
	10.2	3.71	15				60.2	3.84	59
	20.0	3.73	32						
	40.2	3.78	81						
				Leaf Just Below Ear - Main Stalk					
	0	3.83	16	0	3.83	.47	0	3.78	41
	5.2	3.89	20	1260	3.83	.46	30.2	3.85	55
	10.2	3.75	23				60.2	3.86	67
	20.0	3.88	52						
	40.2	3.80	100						
				Leaf Just Below Tassel					

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Table 8 Cont'd

Date	Borax (lbs per acre)	Leaf N	Leaf B	Superphosphate (lbs per acre)	Leaf N	Leaf P	Zinc Sulfate (lbs per acre)	Leaf N	Leaf Zn
July 25	0	3.51	10	0	3.53	.43	0	3.50	34
	5.2	3.59	10	1260	3.46	.43	30.2	3.43	46
	10.2	3.38	11				60.2	3.56	53
	20.0	3.46	15						
	40.2	3.54	24						
				Leaf Just Below Ear - Main Stalk					
	0	3.62	18	0	3.63	.44	0	3.59	62
	5.2	3.57	18	1260	3.56	.43	30.2	3.63	80
	10.2	3.53	20				60.2	3.56	91
	20.0	3.62	32						
	40.2	3.62	57						
				Leaf Just Below Tassel					

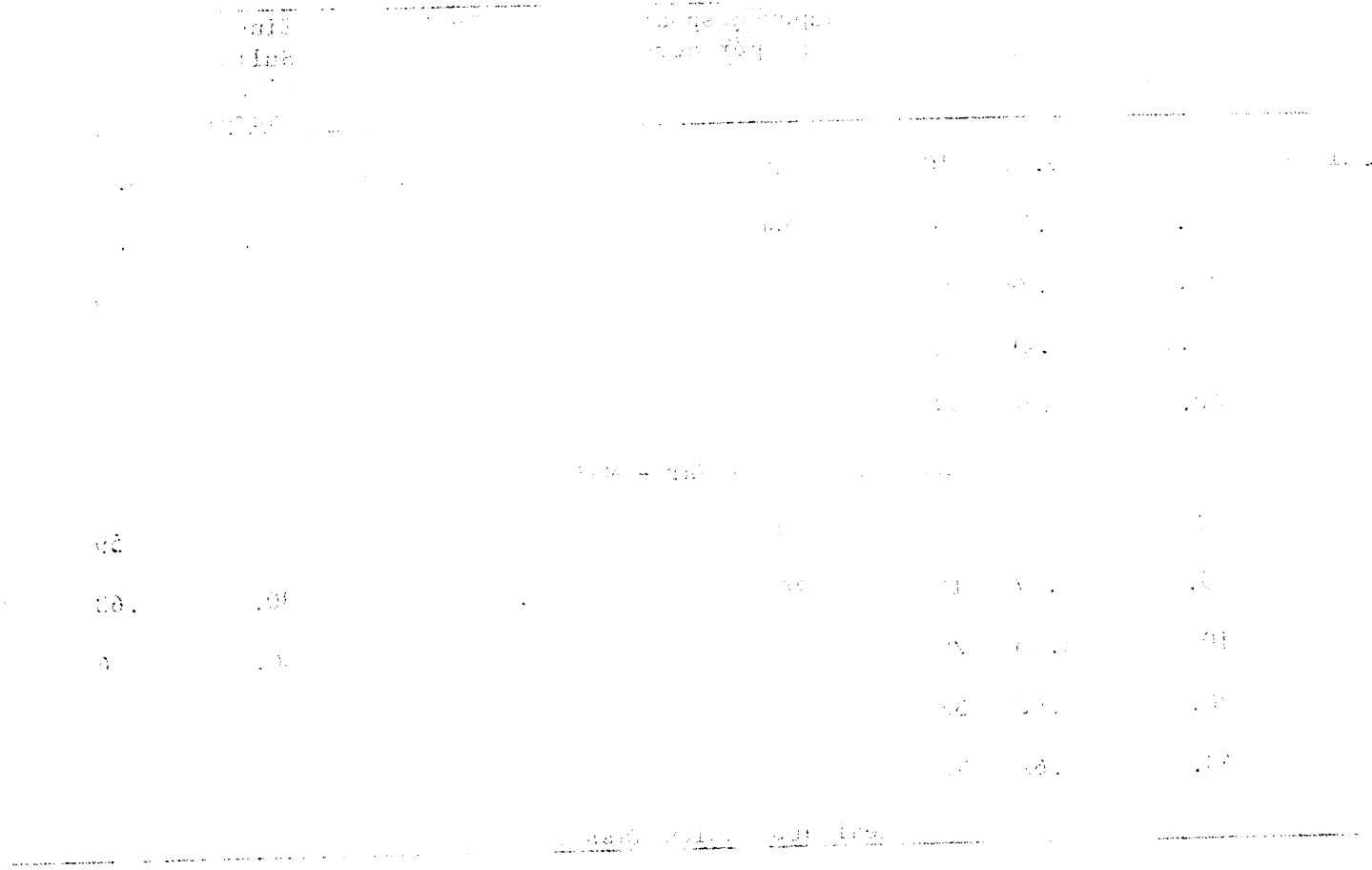

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Table 9

Significant Correlations at Various Sampling Dates
Between Leaf Nutrients and Yield of Sweet Corn 1968

Marietta Vegetable Crops Branch

June 28 - 2nd Leaf From Top of Plant

Stand

Phosphorous .277
Boron -.526

Number Marketable Ears

Boron -.277

Weight Marketable Ears

Phosphorous .317
Boron -.282

Number of Cull Ears

Zinc .257

Weight of Cull Ears

Zinc .265

July 9 - Leaf just Below Ear - Main Stalk

Stand

Potassium -.324
Boron -.472

Number Marketable Ears

Boron -.272

Weight of Marketable Ears

Boron -.291

July 25 - Leaf Just Below Ear - Main Stalk

Weight of Marketable Ears

Boron -.309

July 25 - Leaf Just Below Tassel

Stand

Potassium -.345
Boron -.592

Weight Marketable Ears

Phosphorous -.303
Boron -.321

Number of Cull Ears

Zinc .267

Weight Culls

Zinc .256

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